IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

LAMBDA OPTICAL SOLUTIONS, LLC, Plaintiff, v. ALCATEL-LUCENT USA INC. and ALCATEL-LUCENT HOLDINGS INC., Defendants.	)	
ALCATEL-LUCENT USA INC. and ALCATEL-LUCENT HOLDINGS INC., Counter-Claimants, v. LAMBDA OPTICAL SOLUTIONS, LLC, LAMBDA OPTICAL SYSTEMS CORP., and ANASTASIOS TZATHAS, Counter-Defendants.	)	Civ. Action No. 10-487-RGA-CJB

REPORT AND RECOMMENDATION

In this patent case filed by Plaintiff Lambda Optical Solutions, LLC ("Lambda" or "Plaintiff") against Defendants Alcatel-Lucent USA Inc. and Alcatel-Lucent Holdings Inc. (collectively, "Alcatel" or "Defendants"), Plaintiff alleges infringement of U.S. Patent No. 6,973,229 ("the '229 patent"). Presently before the Court is the matter of claim construction. I recommend that the District Court adopt the constructions as set forth below.

I. BACKGROUND

A. The Parties

Lambda is a Delaware limited liability company with its principal place of business in Newport Beach, California. (D.I. 1 at ¶ 1) Defendants Alcatel-Lucent USA Inc. and Alcatel-Lucent Holdings Inc. are Delaware corporations, with their principal places of business in New Jersey and Texas, respectively. (D.I. 74 at 9, ¶¶ 1, 2) The parties are part of the global telecommunications market.

B. The '229 Patent

The '229 patent is entitled "Node Architecture for Modularized and Reconfigurable Optical Networks, and Methods and Apparatus Therefor," and was issued on December 6, 2005. (D.I. 178, ex. B)[1] The '229 patent lists three inventors: Anastasios Tzathas, Moon W. Kim, and Abdella Battou. (*Id.*) Counter-Defendant Lambda Optical Systems Corporation ("Lambda Systems") is the sole assignee of the '229 patent, and Plaintiff is its exclusive licensee. (D.I. 1 at ¶¶ 32, 33) The '229 patent is based on U.S. Appl. No. 09/795,950, which was filed on February 28, 2001. The '229 patent contains thirty claims, four of which (claims 1, 25, 26 and 27) are independent, and forty-nine figures, nearly all of which are schematic drawings.

The '229 patent relates to the field of optical networking, which involves transmitting voice, Internet traffic, and other digital data over fiber-optic cables. Systems that operate in this field convert electrical signals from one endpoint into optical signals (or light pulses) for transmission along fiber-optic cables. After transmission, the light pulses are converted back to electrical signals at another endpoint, so that they can be received by a network user.

Optical signals are often physically combined or "multiplexed" for fiber-optic

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[1] The '229 patent appears several times on the docket, including as an exhibit to the parties' Joint Claim Construction Chart. (D.I. 178, ex. B) Further citations will simply be to the "'229 patent."

transmission over a single, high-speed "long-haul" fiber—a fiber cable that can transmit those signals over long distances. In wavelength division multiplexing ("WDM"), a fiber is shared by dividing the spectrum of light (or "wavelengths" of light). These "wavelength divisions" must be sufficiently spaced apart to prevent the multiple wavelengths from interfering with each other. The International Telecommunications Union has adopted standard wavelength spacing that should be used for such multiplexing, which is reflected in the "ITU grid." (*See* '229 patent, col. 18:9–11 ("The ITU grid specifies the minimum spacing and the actual wavelengths of the individual wavelengths in a WDM system.")) A wavelength that conforms to the ITU grid is considered "compliant." (*See, e.g.*, *id.*, col. 5:63–64)

The '229 patent is directed to one aspect of optical networking: an optical transport switching system.[2] In both of the asserted independent claims of the '229 patent, the claimed optical transport switching system has five subsystems, as highlighted below in claim 1:

> An optical transport switching system for use in an optical network, comprising:
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> an *optical access ingress subsystem* which is adapted to receive an optical signal associated with an access network;
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> an *optical access egress subsystem*;
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> a *transport ingress subsystem*;
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> a *transport egress subsystem*;
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> and an *optical switch subsystem* which is adapted to ingress the optical signal into the optical network by optically coupling the optical access ingress subsystem to the transport egress subsystem and which is adapted to selectively provide optical coupling

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[2] In the fiber-optics context, a switching system, or "switch" is generally defined as "[a] mechanical, electrical, or optical device that breaks or completes a path in a circuit, or changes the path." (D.I. 192, ex. 2 at 899)

> between the transport ingress subsystem and at least one of (1) the optical access egress subsystem, and (2) the transport egress subsystem.

('229 patent, col. 54:22–37 (emphasis added)) Asserted independent claim 25 closely tracks the language of claim 1, except that instead of focusing on the two ingress subsystems, it has a description of the two egress subsystems:

> An optical transport switching system for use in an optical network, comprising:
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> an *optical access ingress subsystem*;
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> an *optical access egress subsystem* which is adapted to direct the optical signal toward an access network;
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> a *transport ingress subsystem*;
>
> a *transport egress subsystem*;
>
> and the *optical switch subsystem* is adapted to egress an optical signal from the optical network by optically coupling the optical signal from the transport ingress subsystem to the optical access egress subsystem and is adapted to selectively provide optical coupling between the transport egress subsystem and at least one of (1) the optical access ingress subsystem and (2) the transport ingress subsystem.

(*Id.*, col. 56:28–42 (emphasis added))

C. Procedural Posture

Plaintiff's Complaint, which was filed on June 4, 2010, originally alleged infringement against twenty defendants (D.I. 1); other than Alcatel, all of the other originally named defendants have been dismissed by stipulation. On January 24, 2011, Alcatel timely answered Plaintiff's Complaint, and asserted counterclaims against Lambda, Lambda Systems, and Tzathas, one of the named inventors of the '229 patent. (D.I. 74) The parties have been engaging in

discovery, which is set to close September 21, 2012. (D.I. 142 at 2) On March 28, 2012, this case was referred to me to hear and resolve all pretrial matters, up to and including the resolution of case-dispositive motions.

The parties filed simultaneous opening claim construction briefs on April 16, 2012, and simultaneous responsive briefs on May 7, 2012.[3] (D.I. 190, 191, 201, 203) The Court held a *Markman* hearing on May 30, 2012. (D.I. 215 (hereinafter "Tr."))

II. STANDARD OF REVIEW

The proper construction of claim terms is a question of law for the Court. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995), *aff'd*, 517 U.S. 370 (1996). The Court should generally give claim terms their "'ordinary and customary meaning[,]'" which is "the meaning that the term[s] would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (citations omitted). However, when determining the ordinary meaning of claim terms, the Court should not extract and isolate those terms from the context of the patent, but rather should endeavor to reflect their "meaning . . . to the ordinary artisan after reading the entire patent." *Id.* at 1321; *accord Markman*, 52 F.3d at 978 (noting that a patent is a "fully integrated written instrument").

To that end, the Court should look first and foremost to the language of the claims, because "[i]t is a bedrock principle of patent law that the claims of a patent define the invention to which the patentee is entitled the right to exclude." *Phillips*, 415 F.3d at 1312 (internal quotation marks and citations omitted). For example, the context in which a term is used in a

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[3] Plaintiff also filed a corrected responsive brief on May 16, 2012. (D.I. 207)

claim may be "highly instructive." *Id.* at 1314. In addition, "[o]ther claims of the patent, both asserted and unasserted, can be valuable" in discerning the meaning of a particular claim term. *Id.* This is "[b]ecause claim terms are normally used consistently throughout the patent, [and so] the usage of a term in one claim can often illuminate the meaning of the same term in other claims." *Id.* Moreover, "differences among claims can also be a useful guide," as when "the presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim." *Id.* at 1314–15.

In addition to the words of the claims, the Court should look to the remainder of the patent specification. This written description "may reveal a special definition . . . that differs from the meaning [that a given term] would otherwise possess." *Id.* at 1316. In that case, "the inventor's lexicography governs." *Id.* Even if the specification does not contain a special definition of the term-at-issue, it "is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term." *Id.* at 1315 (internal citations and quotation marks omitted). That said, however, the specification "is not a substitute for, nor can it be used to rewrite, the chosen claim language." *SuperGuide Corp. v. DirecTV Enterprises, Inc.*, 358 F.3d 870, 875 (Fed. Cir. 2004). In addition to the specification, a court should also consider the patent's prosecution history, if it is in evidence, because it "can often inform the meaning of the claim language by demonstrating how the inventor understood the invention." *Phillips*, 415 F.3d at 1317 (citations omitted).

Extrinsic evidence, "including expert and inventor testimony, dictionaries, and learned treatises," can also "shed useful light on the relevant art." *Id.* (internal quotation marks and citations omitted). Dictionaries (especially technical dictionaries) may be useful in this process

because they typically provide "the accepted meanings of terms used in various fields of science and technology." *Id.* at 1318. However, the Federal Circuit has cautioned that "heavy reliance on [a] dictionary divorced from the intrinsic evidence risks transforming the meaning of the claim term to the artisan into the meaning of the term in the abstract, out of its particular context, which is the specification." *Id.* at 1321. In addition to dictionary definitions, expert testimony can be useful "to ensure that the court's understanding of the technical aspects of the patent is consistent with that of a person of skill in the art, or to establish that a particular term in the patent or the prior art has a particular meaning in the pertinent field." *Id.* at 1318. Nonetheless, courts must not lose sight of the fact that "expert reports and testimony [are] generated at the time of and for the purpose of litigation and thus can suffer from bias that is not present in intrinsic evidence." *Id.* Overall, while extrinsic evidence may be useful, it is "less significant than the intrinsic record in determining the legally operative meaning of claim language." *Id.* at 1317 (internal quotation marks and citations omitted); *accord Markman*, 52 F.3d at 981.

In utilizing these resources during the claim construction process, courts should keep in mind that "[t]he construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct construction." *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1250 (Fed. Cir. 1998).

III. DISCUSSION

A. Agreed Constructions

1. "access network"

In their Joint Claim Construction Chart, the parties agreed that the phrase "access network" means "a network external to the optical network." (D.I. 178, ex. A at 1) This

proposed construction accurately reflects the claim context and teachings of the specification, which both depict and describe the access network as external to the optical network. (*See, e.g.*, '229 patent, FIG. 2; col. 5:55–59 (noting that the access network is separate from the optical network and may support various non-optical voice and data services, "including switched services such as telephony, ISDN, interactive video, Internet access, video-conferencing and business services")) Because the parties agree on a definition that is consistent with the intrinsic record, the Court will adopt that construction. *See, e.g.*, *Cooper Notification, Inc. v. Twitter, Inc.*, Civil Action No. 09-865-LPS, 2012 WL 528137, at *3 (D. Del. Feb. 17, 2012) (construing the term "first message" consistent with a proposal agreed to at the *Markman* hearing).

2. "all-optical switch"

Although the parties originally disputed the meaning of the term "all-optical switch," (D.I. 178, ex. A at 6–7), Plaintiff informed the Court during the *Markman* hearing that it agreed to Defendants' proposed construction (Tr. at 41). Defendants propose that the term "all-optical switch," which appears only in dependent claim 2, be construed to mean "a device that switches optical signals without electrical conversion." (D.I. 178, ex. A at 6) This construction accurately reflects the claim context and comports with the remainder of the specification. (*See, e.g.*, '229 patent, col. 1:19–27 (distinguishing between "all-optical" switching and switching that involves intermediate conversion of an optical signal to an electrical signal)) This construction also comports with the typical usage of the term "all-optical" in the relevant art at the time of the invention, as exemplified by Plaintiff's marketing materials. (*See, e.g.*, D.I. 202, ex. 3 at LOS000547; *id.*, ex. 4 at LOS000580) Because the parties agree on a definition that is consistent with the intrinsic and extrinsic record, the Court will adopt that construction.

B. Disputed Terms

The parties dispute the meaning of seven terms that appear in one or more claims of the '229 patent. However, several of the terms are directly related to one another, and describe "mirror image" or companion elements of the claimed system, including terms related to the following: (1) optical access *ingress* subsystem/optical access *egress* subsystem; (2) transport *ingress* subsystem/transport *egress* subsystem; and (3) specified optical *input*/specified optical *output*. The elements that make up each of these corresponding pairs will therefore be considered together.

1. "optical access ingress subsystem"/"optical access egress subsystem"

Defendants propose that the phrases "optical access ingress subsystem" and "optical access ingress subsystem which is adapted to receive an optical signal associated with an access network" be construed to mean "a subsystem with a single-wavelength optical interface that is adapted to receive from an external network a signal with a wavelength that is compliant with the optical network." (D.I. 178, ex. A at 1) Similarly, Defendants propose that the phrases "optical access egress subsystem" and "optical access egress subsystem which is adapted to direct the optical signal toward an access network" be construed to mean "a subsystem with a single-wavelength optical interface that is adapted to direct to an external network a signal with a wavelength that is compliant with the optical network."[4] (*Id.* at 2) Plaintiff responds that neither set of terms needs to be construed, because the Court should apply only the "plain and ordinary

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[4] The only difference between Defendants' proposed constructions for these two terms is that the signals in question are received *from* the external network (for the optical access—or "OA"—ingress subsystem) and are transmitted *to* the external network (for the OA egress subsystem), respectively.

meaning" to these limitations. (*Id.* at 1–2) Alternatively, Plaintiff proposes that these terms be construed to mean "a system for receiving one or more optical signals from an access network" and "a system for sending one or more optical signals to an access network," respectively. (*Id.*)

While both parties generally agree that the optical access ingress subsystem receives signals from the external access network and that the optical access egress subsystem directs signals to that external access network,[5] the parties have a two-fold dispute as to the construction of this claim. First, the parties dispute whether the signals that are received from and transmitted to the access network by the optical access ingress/egress subsystems must be "compliant" with the optical network. (*See, e.g.* Tr. at 46, 73–74) Second, the parties dispute whether those signals must consist only of a "single wavelength." (*See id.*) In light of the substantive and divergent nature of the parties' arguments concerning these two issues, the Court finds that they amount to genuine and fundamental disagreements about the scope of these claim terms. These disagreements therefore must be resolved by the Court at this stage. *See O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1362 (Fed. Cir. 2008).

Before considering the merits of the parties' arguments, the Court notes that although the parties have tended to frame their dispute as a disagreement over what constitutes an optical access ("OA") subsystem, the context of the claims reveals that the crux of this dispute is slightly different. Claim 1 describes the OA ingress subsystem as being "adapted to receive an *optical signal* associated with an access network," while claim 25 describes the OA egress subsystem as

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[5] This understanding is consistent with the description of the two types of access-network modules in the specification: "Optical Access Ingress **230** (FIG. **13**) for ingressing (inputting) one or more signals from an access network, and Optical Access Egress **235** (FIG. **14**) for egressing (outputting) one or more signals to an access network." ('229 patent, col. 18:4–9)

being "adapted to direct the *optical signal* toward an access network." ('229 patent, col. 54:24–26; col. 56:31–32) As this context reveals, the parties' dispute is not so much about the OA ingress/egress subsystems themselves, but rather is about the nature and scope of the "optical signal[s]" that relate to these subsystems. In other words, the question is whether the "optical signal[s]" received and transmitted by the OA ingress/egress subsystems must be optical-network-compliant, single-wavelength signals.

a. Wavelength Compliance vs. Non-Compliance

In determining whether the optical signals received or sent by the OA subsystems must be compliant, the Court looks first and foremost to the claim language. The terms-at-issue appear in Claims 1 and 25, but neither of these asserted independent claims make any reference to whether the optical signals relating to the access subsystems must be optical-network compliant. On the other hand, claims 13–16 (which depend, either directly or indirectly, from claim 1) describe a sixth subsystem that is part of the optical transport switching system—the access line interface ("ALI") subsystem. According to claims 13 and 14, this ALI subsystem "convert[s] an optical signal of an access network that has a wavelength that is non-compliant with the optical network to an optical signal having a wavelength that is compliant with the optical network," and "provides the optical signal having the compliant wavelength to the optical access ingress subsystem." ('229 patent, col. 55:35–45) Claims 15 and 16 describe systems for performing the reciprocal process, where a signal that is compliant with the optical network is received by the ALI subsystem and converted to a wavelength that is compliant with the external access network. (*Id.*, col. 55:46–56)

The remainder of the specification offers further guidance regarding the OA subsystems and whether the signals they receive or transmit must be compliant with the optical network. Optical-network compliance is first mentioned in the Abstract: "Wavelength conversion is provided for *non-compliant wavelengths* of the access networks." (*Id.*, pg. 1 (emphasis added)) Underscoring the importance of wavelength-compliance, the "Summary of Invention" section of the specification likewise notes that "[i]t is an object of the invention to provide wavelength conversion at [an interface between the optical network and access network] for wavelengths of [the] access networks that are *not compliant* with the optical network." (*Id.*, col. 1:41–45 (emphasis added)) Indeed, the overall operation of the optical switching system is determined by whether the wavelengths received from the access network are optical-network compliant:

> [T]he Optical Access Network **205** can access the [all-optical transport switching system, or "OTS"] **200** in two primary ways. Specifically, if the service provider equipment operates with wavelengths that are supported by the OTS **200** of the optical network, such as *selected OC-n ITU-compliant wavelengths*, it can directly interface with the Optical Access (OA) ingress module **230** and egress module **235**. Alternatively, if the service provider equipment is using a *non-compliant wavelength*, e.g., in the 1310 nm range or GbE (or 10 GbE), then it accesses the OTS **200** *via an ALI card* **220**.

(*Id.*, col. 5:59–6:2 (emphasis added)) Table 1 summarizes this dichotomy, with all ITU-compliant wavelengths associated directly with the OA subsystem, and all non-compliant wavelengths associated with the ALI subsystem. (*Id.*, col. 6:20–33)

Figure 2 likewise reflects that the flow of signals within the switching system depends on whether the wavelengths that make up those signals are optical-network compliant. If they are, then they proceed directly from the access network to the OA ingress subsystem (and directly back to the access network from the OA egress subsystem). (*Id.*, FIG. 2) If they are non-

compliant, according to that Figure, they then must first be converted by the ALI before entering the OA ingress subsystem (and converted back to their non-compliant wavelengths by the ALI before delivery from the OA egress subsystem to the access network endpoint). (*See id.*) This "division of labor" is articulated multiple times in the description of the invention. (*See, e.g.*, *id.*, col. 7:38–42 ("[E]ach received signal is amplified and then split at 1x2 dividers/splitters to provide corresponding outputs either to the faceplate of the OA egress cards for compliant wavelengths, or to the ALI cards via the optical backplane for non-compliant wavelengths."); col. 7:45–50 ("The ALI cards perform wavelength conversion for interfacing with access networks that use optical signals that are non-compliant with the OTS. As an example, the ALI card receives non-compliant wavelength signals, converts them to electrical signals, multiplexes them, and generates a compliant wavelength signal."))

The specification also includes a section specifically devoted to a discussion of "Optical Access Modules."[6] (*See id.*, col. 17:64–18:67) In that section, "[t]he optical access [ingress] module **230**" is described as "provid[ing] an OTS with a single wavelength interface to access networks *that use wavelengths that are compliant with the optical network of the OTSs, such as ITU-grid compliant wavelengths*." (*Id.*, col. 17:65–18:1 (emphasis added)) Figure 13 illustrates the architecture of the OA ingress modules, and shows that "each 2x1 switch receives a compliant wavelength (λ) from the faceplate and from the output of an ALI card via the optical backplane."[7] (*Id.*, col. 18:24–26) In other words, the OA ingress subsystem receives

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[6] Both sides have treated the "optical access modules" described in the specification as synonymous with the "optical access ingress/egress subsystems" recited in claims 1 and 25.

[7] The lower-case Greek letter "lambda," or "λ," is often used as a symbol for wavelength. (*See, e.g.*, D.I. 192, ex. 2 at 568)

wavelengths from two sources—directly from the access network (via the faceplate) and from the ALI card—but all of those wavelengths are compliant with the optical network. (*Id.*; *see also id.*, FIG. 13) Figure 14 shows analogous architecture for the OA egress subsystem, which "output[s] eight compliant wavelengths to the faceplate, and eight compliant wavelengths to the input of four ALI cards via the optical backplane." (*Id.*, col. 18:64–66)

When discussing various system configurations within the scope of the claimed invention, the '229 patent specification again emphasizes that non-compliant wavelengths from the access network must be first routed through an ALI subsystem for conversion before being directed to the OA ingress subsystem. As illustrated by Figure 24, "when the incoming optical signals are compliant, e.g., with the ITU grid . . . [then] [ALI] modules are not needed since the wavelengths are input directly from the access network to the OA_In cards [i.e., the OA ingress subsystem]." (*Id.*, col. 24:31–34) In contrast, "FIGS. **25** and **26** show the OTS configurations when non-compliant wavelengths are used." (*Id.*, col. 24:40–41) In that case, "the OTS **200***c* uses the ALI modules **220** for converting the non-compliant wavelengths to compliant wavelengths, e.g., using any known wavelength conversion technique. The OA_In modules **230** receive the compliant wavelengths from the ALIs **220** and provide them to the switch fabric **210**." (*Id.*, col. 24:44–49) A number of different configurations are discussed, but all of these include the same routing of signals through the ALI subsystem when the signals from the access network are not compliant with the optical network:

> Similarly, any concurrent combination of the following is possible: (a) inputting OTS-compliant signals from one or more access networks to the OA_In modules, (b) inputting non-OTS-compliant signals from one or more access networks to the ALI modules, (c) outputting signals, which are both OTS- and access-network

> compliant, from the OA_Eg modules to one or more access networks, and (d) outputting signals, which are OTS-compliant but non-compliant with an access network, to the ALI modules.

(*Id.*, col. 25:1–9; *see also id.*, col. 27:63–67 ("For compliant wavelengths, OC-n uses only the OA portion, not the ALI portion. For non-compliant wavelengths, the ALI is used for wavelength conversion, through an O-E-O process, then the OA is used for handling the newly-compliant signals."))

As the foregoing discussion indicates, the claim language, figures, and remainder of the specification lead inexorably to a single conclusion—the signals that are received by the OA ingress subsystem and sent from the OA egress subsystem must be compliant with the optical network. When the access network uses optical signals that are not compliant, the ALI subsystem is used to convert the signal. The Court is cognizant that the difference between improperly importing limitations from the specification into the claims on the one hand, and properly tethering the claimed invention to that which is described in the specification on the other hand, can sometimes seem a fine line to walk. However, here the repeated and unequivocal references to signal compliance in the '229 patent show a clear intention to limit the nature of the optical signals at issue in this way. The use of compliant signals for the OA subsystems is not a preferred embodiment; it is the only embodiment within the scope of the invention. *See, e.g.*, *Hologic, Inc. v. SenoRx, Inc.*, 629 F.3d 1329, 1338 (Fed. Cir. 2011) (limiting the construction of a term where "the specification, including the figures, consistently and exclusively" disclosed only one embodiment, and "that is clearly what the inventors of the patent conceived of"); *accord Honeywell Int'l, Inc. v. ITT Indus., Inc.*, 452 F.3d 1312, 1318–19 (Fed. Cir. 2006).

In opposing Defendants' construction, Plaintiff offers three primary arguments. First, Plaintiff asserts that "Figure 2 . . . shows the optical access ingress subsystem (230) receiving non-compliant signals that come from the access network (205), after the non-compliant signals have passed through the access line interface (220)." (D.I. 207 at 3) Plaintiff's interpretation of that Figure is incorrect—the ALI is not merely a conduit through which non-compliant signals from the access network pass unmodified to the OA ingress subsystem. Instead, the specification makes clear that any non-compliant signals passing through the ALI cards will be converted into signals that are compliant with the optical network. (*See, e.g.*, '229 patent, col. 7:45–50) Thus, by the time these signals are received by the OA ingress subsystem, they are compliant signals—as they must be, according to the specification.

Second, Plaintiff argues that "Figures 28 and 29 . . . show that the optical access subsystems can be combined with ALI modules, enabling the optical access subsystems to convert non-compliant signals to compliant signals." (D.I. 207 at 4; *see also* Tr. at 61–63) Figure 28 illustrates the use of the optical switching system in conjunction with a particular type of access network (a Gigabit Ethernet ("GbE") network), while Figure 29 "shows an example of interconnectivity of the optical network with OC-12 legacy networks." ('229 patent, col. 26:35–37, col. 27:49–50) As an initial matter, unlike the other schematics, Figures 28 and 29 depict the "ALI/OA *function*," and "OA/ALI *function*" rather than the particular constituent subsystems. (*See id.*, col. 26:65 (emphasis added); col. 27:9 (emphasis added)) These functions are identified as elements **2812** and **2836** in Figure 28, and elements **2912** and **2936** in Figure 29.

(*See, e.g.*, *id.*, col. 26:65–67; col. 27:9; col. 28:8–9) None of these elements are ever described as an OA module or subsystem (which is the claim limitation relevant to the dispute here).[8]

Moreover, the descriptions of Figure 28 and Figure 29 make clear that the ALI is not subsumed within the OA ingress or egress subsystems, but instead is a separate and independent subsystem that converts wavelengths before they enter or leave the OA subsystems. For example, the description of Figure 28 notes that after multiplexing, the GbE packetized data used in this embodiment is "converted to a compliant wavelength," and then "handled as compliant wavelength streams *as described above*." (*Id.*, col. 26:42–47 (emphasis added)) The "above" description referred to in the context of Figure 28 universally describes the OA modules as receiving wavelengths only after they have been converted to a compliant state. (*See, e.g.*, *id.*, col. 26:20–33) This is consistent with the description of Figure 29, which emphasizes the distinction between the ALI and the OA subsystems. The specification explains that, as to the processing flow depicted in Figure 29, "[f]or compliant wavelengths, OC-n uses only the OA portion, not the ALI portion. For non-compliant wavelengths, the ALI is used for wavelength conversion, through an O-E-O process, *then* the OA is used for handling the newly-compliant signals."[9] (*Id.*, col. 27:63–67 (emphasis added))

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[8] At one point, element **2912** is described as the "ALI/OA module." ('229 patent, col. 27:62) But none of the patent claims include a limitation directed to an "ALI/OA module," so even if a combined "module" is theoretically possible, that is not the subsystem that is claimed when the OA ingress and egress subsystems are recited in claims 1 and 25.

[9] The separate and sequential functions of the ALI and OA subsystems is further confirmed by the depiction of the "processing flow" in Figures 28 and 29. ('229 patent, col. 26:61) For instance, as shown in Figure 28, GbE packets are received and multiplexed at the "ALI/OA function." (*Id.*, col. 26:62–65) Resulting optical signals then proceed through the switch fabric, through the TP module, through the optical network, and then back into a different TP module. (*See id.*, FIG. 28) After flowing through another switch fabric, the signals proceed

The combination of the OA and ALI subsystems in Figures 28 and 29 is therefore best understood as a shorthand way of depicting two separate systems. Indeed, Figures 28 and 29 both show the ALI, OA, switch fabric (SW) and transport modules (TP) as part of a single Optical Add/Drop Multiplexer, but that does not mean that all of the functions have been combined into a single, unitary subsystem.[10] The OA subsystem *itself* is never identified as receiving or transmitting non-compliant signals, whether in the context of Figures 28 and 29 or elsewhere.

Third, Plaintiff also argues that the '229 patent "contemplates the possibility of including the ALI functionality in the optical access subsystems." (D.I. 207 at 4 (quoting '229 patent, col. 23:30–35) ("[W]avelength conversion within the optical fabric is also a possibility as the switch fabric technology develops.")) As an initial matter, the fact that wavelengths might at some undetermined point in the future be converted in the "optical switch fabric" does not resolve the issue of whether the *OA subsystems* as claimed can send or receive non-compliant signals. The switch fabric referred to in this passage is separate and distinct from the OA subsystems. (*See, e.g. id.*, FIGS. 2, 7; col. 4:51–55)) Neither this passage (nor any other passage in the

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to an "OA/ALI function." In other words, packets entering the network pass first through the ALI, then to the OA ingress subsystem (the ALI/OA function), and packets exiting the network pass first through the OA egress subsystem, and then to the ALI (the OA/ALI function). If two subsystems had really been combined into a single, unitary subsystem, then it would be counterintuitive to change the name of that subsystem depending on its placement in the overall system. Instead, the naming convention in Figures 28 and 29 corroborates that these two discrete functions are performed in sequence by two discrete subsystems.

[10] While Plaintiff contends that a person of skill in the art would view these figures as demonstrating "that the optical access systems can subsume the ALI functionality," Plaintiff cites no actual testimony from a person of skill in the art or from another extrinsic source that would confirm that reading. (D.I. 207 at 4)

specification) suggests that the OA subsystem itself is capable of performing wavelength conversion, or trafficking in anything other than optical-network-compliant wavelengths.[11] Indeed, this portion of the specification is best understood not as a description of the claimed invention (and the OA subsystem and switch fabric described therein), but instead as an invitation to invent something new and different, which has not been claimed in the '229 patent. This mere suggestion that a redesigned switch fabric could (in a hypothetical and theoretical world) assume the functionality of another subsystem offers no insight into the contours of the claimed OA subsystem, and the nature of the signals sent and received by it.

Given that the specification consistently and exclusively identifies the optical signals relating to the claimed OA subsystems as optical-network-compliant, the Court's recommended construction below will reflect that limitation.

b. Single Wavelengths vs. Multiplexed Signals

None of the claims indicate how many wavelengths are present in the "optical signals" that are received or transmitted by the OA ingress/egress subsystems. In contrast to the issue of wavelength compliance, there is scant discussion in the specification as to whether the signals in

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[11] Plaintiff argues that Defendants' proposed construction for the OA ingress subsystem terms is flawed because it requires that the OA ingress subsystem be "adapted to receive *from an external network* a signal with a wavelength that is compliant with the optical network." Plaintiff notes that because both parties agree that non-compliant signals *can* flow *from the external network* to the OA ingress subsystem (so long as they are first converted to compliant signals via the ALI card) then Defendants' proposed definition is internally inconsistent. (Tr. at 60 (emphasis added)) The Court does not believe that Defendants' proposed construction is ambiguous on this point—instead, that definition simply focuses on the compliant nature of the signals once they are "receive[d]" by the OA ingress subsystem. However, to clarify that though the signals at issue emanate from an access network (and may be non-compliant at that point), they are compliant at the time they are received by the OA ingress subsystem, the Court will insert the phrase "originating from an access network" into its construction of the terms-at-issue.

question must be single-wavelength, as Defendants propose. However, there is some relevant discussion in the section of the specification devoted to describing the "Optical Access Modules." As noted above, "[t]he optical access [ingress] module **230**" is described as "provid[ing] an OTS with a *single wavelength interface* to access networks that use wavelengths that are compliant with the optical network of the OTSs, such as ITU-grid compliant wavelengths." ('229 patent, col. 17:65–18:1) (emphasis added) But there is no indication in the specification that the OA access subsystems are incapable of interfacing with a multiplexed signal, and the written description does not use the phrase "single-wavelength signal."

Several of the figures in the '229 patent shed further light on the number of wavelengths in the signals received and transmitted by the OA subsystems. Figure 3 of the '229 patent "illustrates an optical transport switching system hardware architecture in accordance with the present invention." (*Id.*, col. 2:15–17) Among the elements depicted in this figure are both of the OA subsystems (shown as elements **230** and **235**, respectively). Figure 3 shows "64 single lambda compliant inputs" entering the OA ingress subsystem **230** and "64 single lambda compliant outputs" leaving from the OA egress subsystem **235**. Similarly, the "Optical Access Ingress, **230**" is illustrated in Figure 13, which shows a multitude of single-λ signals entering the subsystem. The reciprocal scenario is illustrated in Figure 14, which likewise shows several single-λ signals exiting the "Optical Access Egress, **235**."

Similar schematics are provided in Figures 24–26. In Figure 24, a larger "block" style arrow is used to indicate that multiplexed signals come into and out of the transport subsystems, in contrast to the individual arrows that indicate single-wavelength signals coming into and out

of the optical access subsystems.[12] (*See id.*, FIG. 24; *see also* Tr. at 57–58 (Plaintiff's counsel recognizing that a "broad arrow" in the '229 patent represents a multiplexed signal); Tr. at 75–76 (Defendants' counsel recognizing the "convention" in the '229 patent that a "big chunky arrow" is used to denote a multiplexed signal)) Figure 24 is therefore consistent with the other figures discussed above. Figures 25 and 26, on the other hand, show something different. In Figure 25, a block arrow is shown entering the OA ingress subsystem **230**, which indicates that a multiplexed signal is being received by that subsystem from the ALI cards. And in Figure 26, an identical block arrow shows the flow of a multiplexed signal out of the OA egress subsystem **235** and into the ALI cards. ('229 patent, FIGS. 25 & 26) Thus, these figures show two different instances where multiplexed signals are involved with the OA subsystems (going into the OA ingress subsystem in Figure 25, and coming out of the OA egress subsystem in Figure 26).

With that background from the intrinsic record in mind, the Court now turns to the parties' dispute regarding the number of wavelengths in the optical signals. As an initial matter, it is worth noting that the parties (and, in particular, Plaintiff) devote significant portions of their briefs to discussing whether Defendants' proposed construction requires the OA ingress subsystem "to receive only a single *signal*." (D.I. 191 at 5 (emphasis added); D.I. 201 at 5; D.I. 207 at 3 (noting that Defendants' construction is incorrect because "the specification clearly contemplates multiple *signals*") (emphasis added)) But the issue is not whether the OA subsystems can receive/transmit multiple signals; Defendants do not dispute that these

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[12] This depiction of the representation of multiplexed signals is also consistent with that of Figure 2 (where 8 λ's are included in each fiber going into the "TP Ingress") and Figure 23 (where large block arrows are used to indicate the flow of multiplexed signals entering and exiting the TP subsystems).

subsystems traffic in multiple signals. Indeed, Defendants have cited Figure 3, which shows an OA subsystem receiving sixty-four signals. (D.I. 190 at 8–9) Instead, the question is whether those multiple *signals* must each consist of a single *wavelength*.

As the Figures discussed above illustrate, Defendants are not correct that "[t]here is no disclosure in the specification of an optical access subsystem sending or receiving multi-wavelength signals." (D.I. 190 at 8; *see also* D.I. 201 at 5 ("The intrinsic evidence shows—without exception—that access subsystems interface only with single-wavelength signals.")) It is true that most of the embodiments depicted in the '229 patent show single-wavelength signals entering or leaving the access subsystems.[13] ('229 patent, FIGS. 3, 13, 14, 24) But that is not universally true—in Figures 25 and 26, multiplexed signals are shown entering the OA ingress subsystem and leaving the OA egress subsystem. Thus, at least certain embodiments of the claimed invention include OA subsystems that send or receive multiplexed signals. (*Id.*, FIGS. 25, 26)

At the *Markman* hearing, Defendants' counsel argued that Figures 25 and 26 "are not the figures that depict what's claimed in the claims that are at issue before the Court," because they do not each depict "the five necessary subsystems that are required in Claim 1 and Claim 25." (Tr. at 78) However, Defendants cited both of these Figures as providing intrinsic support for their proposed constructions for the terms in claims 1 and 25, suggesting that Defendants were

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[13] Plaintiff contends that a person of ordinary skill in the relevant art would understand the "single line" in Figure 2 leading from the access network to the OA ingress subsystem to "demonstrate[] that the access network can carry multi-wavelength signals, and should not be limited to carrying single-wavelength signals." (D.I. 207 at 6 n.2) Plaintiff does not, however, cite any testimony from a person of ordinary skill in this regard, and none of the treatises or dictionaries cited by Plaintiff corroborates such an interpretation of Figure 2.

not always of the view that these figures are irrelevant to the construction of these claims. (D.I. 178, ex. A at 1–2) And while Defendants' counsel correctly noted that Figure 25 is an "add-only" configuration and Figure 26 is a "drop-only" configuration, (Tr. at 103), the '229 patent makes clear that "the processes of FIGS. **25** and **26** may occur at the same time via one or more ALI cards." ('229 patent, col. 24:53–54) Indeed, the patent specifically contemplates combining the processes depicted in Figures 25 and 26 to create a single system: "For *concurrent add and drop multiplexing* of non-compliant signals, the ALI modules both provide inputs to the OA_In modules **230**, and receive outputs from the OA_Eg modules **2[3]5**." (*Id.*, col. 24:64–67 (emphasis added)) Thus, although not all of the elements of the five subsystems from Claims 1 and 25 are shown in Figure 25 or 26 alone, these two figures simply provide a close-up view of two different aspects of the same overall system. As such, "single-wavelength" signals do not appear to be essential to the OA subsystems, but instead are merely part of certain embodiments.

Defendants also cite to several portions of the specification's text that describe the OA subsystems, but none conclusively establishes the type of optical signal associated therewith. For instance, Defendants focus on a portion of the specification where "[t]he optical access module **230**"[14] is described as "provid[ing] an OTS with a single wavelength interface." ('229 patent, col. 17:65–66) But as Plaintiff points out, the phrase "single wavelength" is not hyphenated, and thus the adjective "single" in that phrase could just as easily be read to modify the term "interface,"

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[14] Although Defendants have read the first sentence of the "Optical Access Modules" section of the specification to encompass both access subsystems, this sentence specifically refers only to element **230**, which is the OA *ingress* subsystem. No corresponding description is included for element **235**, which is the OA *egress* subsystem. The absence of any such description for the OA egress subsystem also provides support for the conclusion that single-wavelength signals are not essential to the operation of the claimed OA subsystems.

rather than the term "wavelength." Under this reading, the OA ingress subsystem is merely the "single" access point for wavelengths (whether multiplexed or not) to enter the optical network. Although that is not the only plausible reading of this portion of the patent, it also makes sense within the context of the overall invention. This passage notes that there is a single "interface" that is used for "wavelengths that are *compliant* with the optical network." (*Id.*, col. 17:66–67 (emphasis added)) And that fact is supported by the Figures—when compliant signals are produced by the access network, there is a single interface by which those signals enter the optical network (the OA ingress subsystem). (*See, e.g.*, FIG. 3) However, if an access network were to produce some non-compliant and some compliant signals, then there would be *two* interfaces with the access network (the OA ingress subsystem, and the ALI). (*See id.*) Thus, while there certainly might be multiple OA cards or ALI cards, there is a single set of subsystems at the access-network interface point in the case of compliant signals.

The other portions of the specification cited by Defendants in support of their "single-wavelength" construction are similarly unclear. For instance, the specification notes that "[t]he present invention provides for an all optical configurable switch . . . that can operate as an optical cross-connect . . . which switches individual wavelengths." ('229 patent, col. 3:63–67 (cited in D.I. 201 at 5)) But this passage cannot be read to require the OA subsystems to interface only with single-wavelength signals; the OA subsystems are not even mentioned. Instead, this passage only confirms that certain signals passing from the OA subsystems to the switch, or being received by the OA subsystems from the switch, may be single-wavelength. That does not establish whether *all* of the signals at the OA subsystem interface must be single-wavelength, as Defendants have proposed in their construction. Similarly, Defendants cite a passage relating to

the use of a "demux" (or de-multiplexer) in the transport modules to "separate[] out each individual wavelength (optical transport signal) in the multiplex." ('229 patent, col. 7:23–26 (cited in D.I. 201 at 5)) While it is true that no demux is depicted in the particular OA subsystems in Figure 3, that does not mean that all embodiments of the OA subsystems are incapable of interfacing with signals other than those that are single-wavelength. And finally, Defendants cite a portion of the specification noting that "[a]ll inputs to a switching element carry one wavelength (i.e., one optical signal as opposed to a multiplex of optical signals)." ('229 patent, col. 16:2–4 (cited in D.I. 201 at 5)) This sentence does not mention the OA subsystem, and is instead focused on the type of inputs that can be received by a "switching element," not an OA access or egress element specifically.

As outlined above, while the '229 patent shows OA subsystems receiving and transmitting single-wavelength signals when the source of those signals is optical-network compliant, those signals are not always single-wavelength when the source is non-compliant. Moreover, the specification is devoid of any description limiting the "optical signals" referenced in the claims to only those that are "single-wavelength." The Court therefore discerns no "clear intention" on the part of the '229 patent inventors to limit the "optical signals" recited in the asserted claims to the particular embodiments where those signals are single-wavelength (as opposed to embodiments, such as those in Figures 25 and 26, where they are multiplexed). *See, e.g., Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 906 (Fed. Cir. 2004). Thus, in contrast to the issue of signal "compliance," the Court here cannot conclude that the claim language should be limited to optical signals that are "single-wavelength."

c. Recommended Construction for OA Subsystems

For the foregoing reasons, the phrases "optical access ingress subsystem" and "optical access ingress subsystem which is adapted to receive an optical signal associated with an access network" should be construed to mean "a subsystem for receiving one or more optical signals, originating from an access network, which are compliant with the optical network." Similarly, the phrases "optical access egress subsystem" and "optical access egress subsystem which is adapted to direct the optical signal toward an access network" should be construed to mean "a subsystem for directing one or more optical signals, which are compliant with the optical network, toward an access network."

2. "transport ingress subsystem"/"transport egress subsystem"

Defendants propose that the phrase "transport ingress subsystem" be construed to mean "a subsystem with an optical interface that receives a multiplexed multi-wavelength (per optical fiber) signal from the optical network and transmits single-wavelength signals." (D.I. 178, ex. A at 3) Similarly, Defendants propose that the phrase "transport egress subsystem" be construed to mean "a subsystem with an optical interface that receives single-wavelength signals and transmits a multiplexed multi-wavelength (per optical fiber) signal to the optical network." (*Id.* at 4) Plaintiff responds that neither term needs to be construed, because the Court should apply only the "plain and ordinary meaning" to these limitations. (*Id.* at 3–4) Alternatively, Plaintiff proposes that these terms be construed to mean "a system for receiving one or more optical signals from an optical network" and "a system for sending one or more optical signals to an optical network," respectively. (*Id.*) The parties' dispute is thus whether the type of wavelength

that enters or leaves the transport subsystems should be included in the Court's construction. (Tr. at 109, 119)

Unlike the OA subsystems, there is no description of the function or components of the transport ("TP") subsystems in either of the asserted independent claims. There is also no description of the type of signals that are sent or received by these subsystems in either claim. However, the optical switch subsystem is described in claim 1 as being "adapted to ingress the optical signal into the optical network by optically coupling the optical access ingress subsystem *to the transport egress subsystem*," and "adapted to selectively provide optical coupling between the *transport ingress subsystem* and at least one of (1) the optical access egress subsystem, and (2) the *transport egress subsystem*." ('229 patent, col. 54:30–37 (emphasis added)) Consistent with this description, dependent claims 4–8 and 10 describe specific coupling of inputs and outputs from the TP subsystems and OA subsystems by the optical switch subsystem. The description in these claims indicates that signals associated with the TP subsystems must be able to be coupled with other signals.

Further insight into the nature of the TP subsystems can be found in dependent claims 11 and 12. Claim 11 requires the TP ingress subsystem described in claim 1 to "receive[] an optical signal multiplex via at least one optical link of the optical network, and [to] comprise[] a demultiplexer for demultiplexing the optical signal multiplex to provide a plurality of individual optical signals to be optically coupled by the optical switch subsystem." (*Id.*, col. 55:21–26) Claim 12 requires that the TP egress subsystem "comprise[] a multiplexer for multiplexing the individual optical signals to provide an optical signal multiplex for transport via at least one

optical link of the optical network." (*Id.*, col. 55:30–34) Thus, certain of the claimed embodiments require a multiplexer or a demultiplexer in the TP subsystems.

The remainder of the specification contains considerable discussion regarding the nature of the wavelengths that are sent and received by the TP subsystems. In Figure 2, which provides the broadest overview of the interplay among the various subsystems, a multiplexed signal (with eight λ's per optical fiber) is shown entering the TP ingress subsystem **240**, and de-multiplexed or single-wavelength signals are shown leaving the TP ingress subsystem and entering the switch fabric. ('229 patent, FIG. 2) Similarly, demultiplexed or single-wavelength signals are shown leaving the switch fabric and entering the TP egress subsystem **245**, and a multiplexed signal is shown leaving the TP egress subsystem. (*Id.*) As illustrated by Figure 3, the TP ingress module receives "eight multiplexed data signals (λ's)," which pass through a "demux" that "separates out each individual wavelength (optical transport signal) in the multiplex." (*Id.*, col. 7:20–26) In other words, the TP ingress module receives a multiplexed signal, which is then separated into its individual, constituent wavelengths by an internal demultiplexer that is part of the TP ingress module. Similarly, the individual, single-wavelength outputs from the switch fabric are received by the TP egress module, which includes a multiplexer for aggregating these wavelengths. (*Id.*, col. 7:28–32) This flow of signals—from the TP ingress into the switch fabric, and from the switch fabric to the TP egress—is illustrated in Figure 7.

Given the general nature of the hardware architecture discussed in the preceding paragraph, it is unsurprising that the TP subsystem is described in terms of multiplexing: "The optical transport module (or "TP" module) is a multiplexed multi-wavelength (per optical fiber)

optical interface between OTSs in an optical network." (*Id.*, col. 16:33–35) The description of the TP subsystems specifically echoes that of the broader hardware architecture:

> In summary, the optical transport module provides demultiplexing of the OSC signal (ingress module), multiplexing of the OSC signal (egress module), . . . demultiplexing of the multi-wavelength transport signal (ingress module), [and] multiplexing of the individual wavelength signals (egress module).

(*Id.*, col. 16:43–50) Figures 11 and 12 show the internal architecture for the TP ingress and egress subsystems, respectively. (*Id.*, col. 16:64–17:44) Multiplexed signals (identified as "8λ + OSC") are shown entering the TP ingress subsystem, with de-multiplexed signals (identified as "λ1 through λ8") being directed to the switch fabric. (*Id.*, FIG. 11) Figure 12 shows the reciprocal operation, with single-wavelength signals (identified as λ1 through λ8) entering the TP egress from the switch fabric, and multiplexed signals (identified as "8λ + OSC") leaving the TP egress. This same depiction for both of the TP subsystems is repeated in Figures 24–26. In each case, the signals entering and leaving the switch fabric, or "optical switching subsystem," are single-wavelength, while the signals entering and leaving the TP ingress and TP egress subsystems, respectively, are multi-wavelength. (*See id.*, FIGS. 24–26)

As with the issue of wavelength-compliance discussed above, when the specification of the '229 patent refers to TP subsystems, it does so in a single context—as the structure within the optical network that takes multiplexed optical signals and converts them to single-wavelength form for delivery to the optical switching subsystem (and vice versa for delivery back to the optical network). As shown in each of the figures and in each of the embodiments described in the specification, although the TP subsystems may (or may not) perform other functions or roles

within the overall system, these multiplexing and de-multiplexing functions are the critical and defining feature of these claim elements, and should be reflected in the Court's construction.

Plaintiff objects to Defendants' proposed constructions on multiple grounds. However, many of Plaintiff's objections can be fully addressed by making minor modifications to Defendants' proposed constructions; others are simply not persuasive.

First, as with the OA subsystems above, Plaintiff objects to Defendants' proposal as unduly restrictive and internally inconsistent because it "unnecessarily require[s] that the [TP subsystems send or] receive only a single signal." (D.I. 207 at 7–8) As previously noted, there is really no dispute among the parties on this issue—both sides agree that one or more signals can be sent and/or received by the subsystems in question, and thus the phrase "a signal" in Defendants' proposal can simply be replaced with the phrase "one or more . . . signals."

Second, Plaintiff argues that certain signals sent from the TP subsystems (such as those to the Optical Performance Monitoring ("OPM") module) are multiplexed.[15] (D.I. 207 at 7; *see also* Tr. at 114–15) For instance, Plaintiff points to Figure 11, and notes that when a signal is received by the TP ingress subsystem, it includes an 8λ-signal and a separate optical signaling channel ("OSC") signal that enter together as part of a single, aggregated signal. (*Id.* at 113) After passing through a demultiplexer (depicted as a "DMUX"), the OSC signal is extracted, while the (still-multiplexed) 8λ-signal is shown passing through a coupler and then to the OPM module. (*Id.* at 113–15) Defendants do not dispute that the performance monitoring system can receive a multiplexed signal, but argue that this monitoring function is different from the concept

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[15] The OPM monitors signal strength to determine if amplification is needed. (Tr. at 124) The OPM thus functions, in some ways, like a phone-tap or wiretap. (*Id.* at 114; *see also* '229 patent, col. 17:8–14)

that their proposed definition is intended to capture, and therefore should not result in a broader construction than what they have suggested. (Tr. at 134–35)

As an initial matter, the Court does not read Defendants' proposed definition as foreclosing the possibility that the TP subsystems can send multiplexed signals to the OPM module. Nevertheless, Plaintiff's concern can be addressed by adding the phrase "to the optical switching subsystem" to the end of Defendants' proposed definition for TP ingress subsystem, and clarifying that the TP egress subsystem receives single-wavelength signals "from the optical switching subsystem." Moreover, the Court agrees with Defendants that, even if multiplexed performance monitoring signals can be sent to the OPM, that is not part of the basic signal processing flow that is outlined in the claims. The claims at issue in the '229 patent are directed to an optical transport switching system, which is ultimately designed to receive and transmit signals from both an external access network and an optical network. Even in Figure 11, the signals which enter the TP ingress subsystem are exclusively depicted as multiplexed, and the signals which are sent to the switch fabric from the TP ingress are universally shown as demultiplexed, or single-wavelength. Thus, while performance monitoring may be important to the overall system performance, the Court does not find any indication in the '229 patent that it should impact the definition of the TP subsystems themselves, which should focus primarily on how their associated signals relate to the central feature of the invention—the switch fabric.[16]

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[16] Indeed, similar "taps" or performance monitoring devices are found in other components of the claimed system, such as in the OA modules. But rather than being identified as a central part of the module architecture, the taps and associated devices are characterized as secondary or auxiliary to the system's central functions. (*See, e.g.*, col. 18:48–49 ("The optical taps, optical splitters and 8x1 optical coupler are passive devices."))

(*See, e.g.*, Tr. at 140 (Plaintiff's counsel stating that the "central component" of the '229 patent is "the switch fabric"))

Third, Plaintiff objects that, unlike Defendants' proposed construction, the ingress subsystem should be defined only in terms of the types of signals it receives (and that the egress subsystem should be defined only in terms of the types of signals it sends). Yet, as noted above, the specification repeatedly and universally describes the signals entering and leaving the switch fabric as single-wavelength, and identifies the TP subsystems as the point at which multiplexed optical signals are de-multiplexed, and vice versa.[17] (*See, e.g.*, '229 patent, col. 16:2–4 ("All inputs to a switching element carry one wavelength (i.e., one optical signal as opposed to a multiplex of optical signals), thus enabling wavelength level switching.")) It is important to situate the TP subsystems in the overall construct of the invention. Therefore, because the nature of both the inputs and outputs of these subsystems is critical to their functionality in the overall system, it is appropriate for the Court's construction for the TP subsystems to reflect each of these features. (*See, e.g.*, Tr. at 127–28)

Fourth, Plaintiff objects to Defendants' constructions as "rewrit[ing]" the language of the claims while "offer[ing] no assistance to a jury." (D.I. 207 at 7–8) Yet the phrase "transport ingress subsystem" is likely to be no more or less familiar to a jury than are the concepts of what types of signals pass from the optical network, through the switch fabric, and back into the optical network through the TP subsystems. Given the likely unfamiliarity of the jury with the concepts and terms in the patent, some clarification and context for the jury is undoubtedly

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[17] This is illustrated primarily in Figures 11 and 12, which show a DMUX (element **1120**) and a MUX (element **1205**).

helpful. While certain language proposed by Defendants is complex, the basic conceptual underpinnings of this definition will undoubtedly be more helpful to the jury than would Plaintiff's proposed construction—which amounts to a generic reference to a system that receives or transmits optical signals (with no additional explanation).

Finally, Plaintiff argued at the *Markman* hearing that specifying the type of signal entering and leaving the TP subsystems would violate the principle of claim differentiation, because claims 11 and 12 identify the nature of that signal, while independent claim 1 (from which they both depend) does not. (Tr. at 110–11) The doctrine of claim differentiation "stems from 'the common sense notion that different words or phrases used in separate claims are presumed to indicate that the claims have different meanings and scope.'" *Seachange Int'l, Inc. v. C-COR, Inc.*, 413 F.3d 1361, 1368 (Fed. Cir. 2005) (citations omitted). Thus, ordinarily "the presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim." *Phillips*, 415 F.3d at 1315.

The Court is not convinced that the presumption of claim differentiation applies here. Claims 11 and 12 both add several limitations that are not present in claim 1. For instance, both of those claims introduce the concept of an "optical link," which is not part of the TP subsystems, and which is not recited in claim 1. (*See* '229 patent, col. 55:22; col. 55:33–34) Thus, although claims 11 and 12 also draw attention to the types of signals entering and leaving the TP subsystems, there are additional limitations that differentiate claims 11 and 12 from claim 1. *See, e.g.*, *Kemco Sales, Inc. v. Control Papers Co.*, 208 F.3d 1352, 1363 (Fed. Cir. 2000) (holding that the district court's construction of a "closing means" in a patent claim for security envelopes to require a fold-over flap did not violate the doctrine of claim differentiation, because the

dependent claim contained an additional limitation relating to sealing the envelope through the application of pressure). Moreover, even if the presumption of claim differentiation did apply, the Court finds that the clear teachings of the specification discussed above rebut that presumption, because the TP subsystems are the point of conversion for optical signals (from multiplexed to de-multiplexed, and vice versa). *See, e.g.*, *Retractable Techs., Inc. v. Becton, Dickinson & Co.*, 653 F.3d 1296, 1305 (Fed. Cir. 2011) ("[A]ny presumption created by the doctrine of claim differentiation will be overcome by a contrary construction dictated by the written description or prosecution history . . . .") (internal quotation marks and citations omitted); *accord Simplification LLC v. Block Fin. Corp.*, 593 F. Supp. 2d 700, 711 (D. Del. 2009) (finding that the claim differentiation presumption was "trump[ed]" by the "prosecution history and specification").

For the foregoing reasons, the term "transport ingress subsystem" should be construed to mean "a subsystem that receives one or more multiplexed signals from the optical network and transmits single-wavelength signals to the optical switching subsystem." Similarly, the term "transport egress subsystem" should be construed to mean "a subsystem that receives one or more single-wavelength signals from the optical switching subsystem and transmits multiplexed signals to the optical network."

3. "selectively provide optical coupling"

Plaintiff argues that the phrase "selectively provide optical coupling," which appears in claims 1 and 25, should be construed to mean "connect a selection of one or more optical inputs and outputs." (D.I. 178, ex. A at 5–6) Defendants argue that this phrase should be construed as part of more extensive claim limitations that appear in claims 1 and 25, respectively:

> Claim 1: "optical switch subsystem . . . adapted to selectively provide optical coupling between the transport ingress subsystem and at least one of (1) the optical access egress subsystem and (2) the transport egress subsystem"
>
> Defendants' Proposed Construction for Claim 1: "subsystem capable of switching optical signals from the transport ingress subsystem to both (1) the optical access egress subsystem and (2) the transport egress subsystem and to at least one of (1) and (2) at any given time"
>
> Claim 25: "optical switch subsystem . . . adapted to selectively provide optical coupling between the transport egress subsystem and at least one of (1) the optical access ingress subsystem and (2) the transport ingress subsystem"
>
> Defendants' Proposed Construction for Claim 25: "subsystem capable of switching optical signals to the transport egress subsystem from both (1) the optical access ingress subsystem and (2) the transport ingress subsystem and from at least one of (1) and (2) at any given time"

The parties' dispute boils down to a question of what the term "selectively provide " means within the context of these claims. When a claim requires a switch that "selectively provide[s]" optical coupling, does that refer to choosing a *pathway* for *wavelengths* generally, or rather does it refer to the capability of a system to optically couple particularly *selected subsystems*? Plaintiff contends that the claim connotes the former, while Defendants argue that it is the latter. (*See* D.I. 191 at 14; D.I. 207 at 12; Tr. at 157–58) Relatedly, when the claims refer to "selectively provid[ing]" optical coupling between one subsystem and "at least one of" two other subsystems, does that require a switch that is capable of making all of the enumerated connections, or would a switch that can make only one of those connections fall within the scope of the claim? (D.I. 190 at 16; D.I. 191 at 15) In other words, would a system that is capable of providing optical coupling *only* between the TP ingress subsystem and the OA egress subsystem, for example, fall within the scope of claim 1? Plaintiff contends that it would, while Defendants argue that it would not. The lynchpin of these inquiries is the meaning of the term "selectively

provide"—once the Court has properly determined what this phrase is intended to connote, the answers to the remaining questions will flow therefrom.

As an initial matter, both parties agree that "selectively provid[ing] optical coupling" between the enumerated subsystems involves the *signals that are associated* with those subsystems. Plaintiff refers to these signals as "optical inputs and outputs,"[18] while Defendants refer to them as "optical signals." In other words, although claims 1 and 25 refer to optical coupling among subsystems (as opposed to information that is received or transmitted by those subsystems), both sides agree that this limitation is properly interpreted as involving coupling among the signals associated with those subsystems (whether referred to as "optical signals" or "optical inputs and outputs").[19] But that does not resolve the central dispute, which is what the claims mean when they refer to "selectively" providing the optical coupling of those signals.

For guidance on resolving the central dispute, the Court looks first to the language of the claims themselves. Several claims, including claims 1 and 25 (where the phrase "selectively provide optical coupling" appears), include a limitation directed simply to "optical coupling," as opposed to the *selective* provision of optical coupling. For instance, claim 1 describes an optical switch subsystem that is not only adapted to "selectively provide optical coupling," but which is also more generally "adapted to ingress the optical signal into the optical network by optically

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[18] Plaintiff notes in the context of a different disputed term that "'[o]ptical input' is understood as information that is provided to a system in the form of an optical signal," and "'optical output' is understood as information that comes out of a system in the form of an optical signal." (D.I. 207 at 16–17 (citation omitted))

[19] The parties' basic understanding of optical coupling appears to be the same, because neither side has asked the Court to construe the other aspect of the optical switching system described in these claims—which, in the case of claim 1, refers to "optically coupling the optical access ingress subsystem to the transport egress subsystem."

coupling the optical access ingress subsystem to the transport egress subsystem." ('229 patent, col. 54:30–33) Similarly, claim 4 (which depends from claim 1) describes an "optical switch subsystem [that] is configurable to provide add multiplexing by optically coupling a specified optical output of the optical access ingress subsystem with a specified optical input of the transport egress system." (*Id.*, col. 54:45–49) This context strongly suggests that "selectively providing optical coupling" refers to linkage of selected subsystems, rather than the more generalized routing of signals. If a switch could "selectively provide optical coupling" merely by selecting a particular route for a signal, then the term "selectively" would be meaningless. Such routing must occur in any instance of optical coupling, such as those identified elsewhere in claims 1 and 4. In other words, the claim context indicates that the "selectively" limitation must mean more than just directing wavelengths along a *selected* path.

That claim context is consistent with the teachings of the specification. Although the phrase "selectively provide optical coupling" appears only in claims 1 and 25, there is considerable insight to be gained from the description of optical coupling in the specification. For instance, the Abstract describes four different types of "[o]ptical circuit cards," which correspond to the four different OA and TP subsystems enumerated in claim 1. The "optical switching fabric provides *selective optical coupling between the cards*." ('229 patent, page 1 (emphasis added); *see also id.*, col. 6:55–60 ("[S]elected outputs of the TP ingress cards **240** and OA ingress cards **230** are optically coupled by the switching fabric cards **210** to selected inputs of the TP egress cards **245** and/or OA egress cards **235**.")) In other words, the various cards (or subsystems) are a central part of the "selective" feature of the switch, and are not merely incidental when it comes to selecting a particular signal pathway.

Both parties have relied on a particular passage from the specification to support their respective proposals. (*See, e.g.*, D.I. 190 at 16; D.I. 191 at 14) This passage, which describes Figure 3, notes that through the use of control signals,[20]

> [T]he switching fabric is controlled to optically couple selected inputs and outputs of the switch fabric card, thereby providing selective optical coupling between the outputs of the TP ingress and OA ingress cards, and the inputs of the TP egress and OA egress cards. As a result, the optical signals carried by the outputs of the TP ingress and OA ingress cards can be selectively switched (optically coupled) to the inputs of the TP egress and OA egress cards.

('229 patent, col. 7:6–14) Plaintiff contends that the portion of this passage that describes "optically coupl[ing] selected inputs and outputs" supports its view that any "selective" optical coupling is happening at the "wavelength level," while Defendants focus on the remaining language in the specification, which emphasizes a switch capable of creating signal pathways that are "selectively switched" to one of two particular subsystems. (*See, e.g.*, D.I. 190 at 16; D.I. 191 at 14; *see also* Tr. at 144, 148, 157–58)

Plaintiff's reading of this portion of the specification is not persuasive. Figure 3 illustrates the routing of signals from the OA ingress subsystem (**230**) to both the OA egress subsystem (**235**) and the TP egress subsystem (**245**). While Figure 3 certainly supports the general proposition, advanced by Plaintiff, that the switch fabric routes wavelengths to provide optical coupling, both this Figure and the accompanying written description illuminate that "selective" optical coupling means that those signals have to be capable of traveling via a particular path between particular subsystems. (*Id.*, col. 7:6–14) As such, this portion of the specification (and the above-discussed claim context and other portions of the specification)

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[20] Manual selection of a signal path is also possible within the scope of the invention. ('229 patent, col. 34:44–46)

support Defendants' proposed construction—which emphasizes that "selective" optical coupling refers to the ability to select a signal path between the enumerated *subsystems*, not just the overall capability to provide different signal *paths*.

Although Plaintiff cites other portions of the specification, none of these passages supports a construction that would omit the central importance of a switch that is capable of making connections at the subsystem level, not just at the wavelength level. For instance, at the *Markman* hearing, Plaintiff's counsel also cited Figure 10, arguing that selective optical coupling was provided simply by the ability to route a wavelength from, for instance, "Input Fiber 8" to "Output Fiber 1." (Tr. at 142–44) But Plaintiff has pointed to no description of Figure 10 that indicates that it illustrates the *selective* optical coupling required by claims 1 and 25; if anything, Figure 10 simply depicts "wavelength-level switching." ('229 patent, col. 16:20–21)

As the foregoing discussion demonstrates, the intrinsic record leads to the conclusion that the phrase "selectively providing optical coupling" refers to the capability of a system to optically connect *selected subsystems* that are identified in claims 1 and 25, respectively.[21] That determination also informs the meaning of the phrase "at least one of" in both of those claims, which must therefore refer to a subsystem that is capable of making optical connections (in the case of claim 1) between the TP ingress and (1) the OA egress; and (2) the TP egress; or (3) both. (Tr. at 156) However, consistent with its view that merely coupling inputs and outputs by routing them along a given path is sufficient to "selectively provide optical coupling," Plaintiff

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[21] Because of this conclusion, the Court finds that it should construe the entire claim phrase, not merely the "selectively provide" phrase as Plaintiff suggests, in order to fully define and clarify the capability of the switch subsystem, and to situate that capability in the context of the particular OA and TP subsystems enumerated in the claim.

contends that there should be no requirement in the Court's construction that the switch subsystem be required to optically connect *both* to the OA egress and TP egress.

Plaintiff appears to argue that the term "at least one of" should mean "either"—in other words, a switch that is capable of forming connections to only one of the two enumerated subsystems would be sufficient to fall within the scope of the claim. In support, Plaintiff highlights Figures 23, 25, and 26, which show the TP ingress connected only to the TP egress, the OA ingress connected only to the TP egress, and the TP ingress connected only to the OA egress, respectively. (Tr. at 170–72; D.I. 207 at 13, 15) Plaintiff asserts that Defendants' construction would "not allow[]" for those embodiments. (Tr. at 171) The Court disagrees. Figure 23 shows an "optical cross-connect (OXC) configuration," where there appears to be no access network and no OA ingress or egress modules. (D.I. 201 at 12–13) Thus, at least as shown in that particular configuration, it is an unclaimed embodiment. As for Figures 25 and 26, these show "add-only" and "drop-only" multiplexing, respectively. Defendants' construction does not foreclose the possibility of add-only or drop-only systems; it instead describes a switch subsystem that is capable of making several connections, including the ones that are illustrated in Figures 25 and 26. For instance, in Figure 26, a selected path has been outlined—the switch has been configured so that the only path selected is from the TP ingress to the OA egress. But in order for "selective" optical coupling to have occurred, the switch that made that connection must have been capable of choosing a path to a different subsystem. Thus, while Plaintiff's position might hold intuitive appeal in a vacuum (i.e., if the claim did not refer to "selectively" providing coupling), it does not comport with the particular context of the claims at issue. If the "at least one of" language is to mean anything in the particular context of claim, it must refer to a switch

that is capable of selecting a path that runs from the TP ingress to the OA egress, *and* also being capable of selecting a path that runs from the TP ingress to the TP egress.[22]

While Defendants' construction better reflects the contextual framework of claims 1 and 25, it should be modified slightly to reduce the possibility of later confusion. First, Defendants have inserted the word "both" into their proposed construction, while retaining the phrase "at least one of." (Tr. at 151) Although the "selective" providing of optical coupling does require a capability to connect to both subsystems, Defendants' construction has the potential to confuse the jury. The Court's construction below attempts to remedy that issue. In addition, Plaintiff's counsel has also objected to the use of the phrase "at any given time" in Defendants' proposed construction, arguing that it "introduc[es] a temporal constraint" that is inappropriate. (Tr. at 149, 154) The Court fails to see how the phrase "at any given time" imposes a meaningful "temporal constraint"—the Court interprets this phrase as simply reinforcing the point that in order to provide selective optical coupling as described in claims 1 and 25, the switch must be capable (at any point in time) of providing the two different pathways described. On the other hand, the Court fails to see how this phrase would offer additional clarity; this concept is already reflected in the use of the word "capable."[23]

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[22] Or, in the case of claim 25, a switch that is capable of providing a path that runs to the TP egress from the OA ingress, and to the TP egress from the TP ingress.

[23] The Court notes that Plaintiff's counsel also objected to the use of the word "switching" in Defendants' construction, and proposes the word "connecting" instead. (Tr. at 170–72) It appears to the Court that switching, coupling, and connecting are all directed to the same basic concept, which is that the enumerated subsystems are linked, not through a physical connection, but rather by optical connection that is created by the switching subsystem. (*See, e.g.*, '229 patent, col. 7:11–14 ("As a result, the optical signals carried by the outputs of TP ingress and OA ingress cards can be *selectively switched (optically coupled)* to the inputs of the TP egress and OA egress cards.") (emphasis added))

For the foregoing reasons, the Court will construe the phrase "adapted to selectively provide optical coupling between the transport ingress subsystem and at least one of (1) the optical access egress subsystem, and (2) the transport egress subsystem" in claim 1 to mean "capable of switching optical signals from the transport ingress subsystem to (1) the optical access egress subsystem and to (2) the transport egress subsystem." Similarly, the Court will construe the phrase "adapted to selectively provide optical coupling between the transport egress subsystem and at least one of (1) the optical access ingress subsystem and (2) the transport ingress subsystem" in claim 25 to mean "capable of switching optical signals to the transport egress subsystem from (1) the optical access ingress subsystem, and from (2) the transport ingress subsystem."

4. "specified optical input"/"specified optical output"

Defendants propose that the phrase "specified optical input" be construed to mean "selected one of multiple input optical ports." (D.I. 178, ex. A at 7) Similarly, Defendants propose that the phrase "specified optical output" be construed to mean "selected one of multiple output ports." (*Id.* at 8) Plaintiff argues that no construction of either term is necessary, and that the Court should simply apply the "plain and ordinary meaning" of the terms. (*Id.* at 7–8) In the alternative, Plaintiff proposes that these terms be construed to mean "a particular optical input" and "a particular optical output," respectively. (*Id.*) The parties' dispute requires the Court to resolve whether the "inputs" and "outputs" recited in dependent claims 4, 5, 7, and 8 refer to the physical ports associated with the subsystems, or whether they refer to the optical signals that pass through these physical ports. (Tr. at 177; 183)

The claim language suggests that "inputs" and "outputs" in this context refer to the optical signals, rather than the associated physical ports. For instance, claim 4 describes a switch subsystem that "is configurable to provide *add multiplexing* by optically coupling a specified optical *output* of the optical access ingress subsystem with a specified optical input of the transport egress subsystem." ('229 patent, col. 54:45–49 (emphasis added)) Claim 5 uses similar terms to describe drop multiplexing, which occurs by "optically coupling a specified optical output of the transport ingress subsystem with a specified optical input of the optical access egress subsystem." (*Id.*, col. 50–55) As Defendants' counsel noted during the *Markman* hearing, multiplexing involves combining multiple wavelengths into a single signal, not the physical combination of ports. (*See, e.g.*, Tr. at 29–33) Indeed, there is no mention in the claims of any physical ports or points of entry or exit for any of the subsystems described in the claims.

Turning to the specification, the Court notes that, at times, the terms "input" and "output" are used to describe physical ports through which signals pass. (*See, e.g.*, col. 7:1–3 "[E]ach TP ingress and OA ingress card has appropriate optical outputs for providing optical coupling to inputs of the switch fabric via the optical backplane.")) More frequently, however, when these terms are used in connection with physical ports or fibers, they are used as adjectives, rather than nouns. (*See, e.g.*, col. 23:17–21 ("Moreover, each TP_In card has one input port/fiber and each TP_Eg card has one output port/fiber."); col. 17:1 (referring to an "input port"); Table 1 (describing the "16 ports" as "8 input and 8 output"); col. 20:18–20 (same))

When the terms "input" and "output" are used alone in the '229 patent, they more commonly connote optical signals themselves, rather than an associated physical port. (*See, e.g.*, *id.*, FIG. 3 (referring to "64 single lambda compliant inputs"); col. 7:50–55 ("Two optical signals

that are output from the ALI card **220** are shown as inputs to one of the OA_In cards . . . ."); col. 14:8–30 (summarizing the input and outputs signals sent and received by the different subsystem cards); col. 16:13–15 ("The switch fabric **210** may receive optical inputs from an input module **1070** such as a transport ingress card and/or an optical access ingress card. The switch fabric provides the corresponding optical outputs to designated ports of an output module **1080** . . . ."); col. 24:64–67 ("For concurrent add and drop multiplexing of non-compliant signals, the ALI modules both provide inputs to the OA_In modules **230**, and receive outputs from the OA_Eg modules **245**.")) Plaintiff's construction is consistent with this context from the specification.

At the *Markman* hearing, Defendants' counsel noted that the parties were generally in agreement about the manner in which signals were linked or coupled, but argued that the signals needed to be carried over a fiber, and pass through a physical port. (Tr. at 183) A preferred embodiment for the claimed switch is a micro-electro-mechanical or "MEMS" switch. (*See, e.g.*, '229 patent, col. 5:45–50) These MEMS switches "have arrays of tiny mirrors" that can be oriented so that "any optical signal from an input fiber . . . can be routed to any output fiber." (*Id.*, col. 5:50–54; *see also* Tr. at 17) Thus, while Defendants are correct that physical fibers are part of the optical coupling process, at least certain of the light transmission steps for at least certain embodiments do occur in open air. This fact reinforces the notion that when the dependent claims refer to optical coupling of inputs and outputs, those references are to the signals themselves, as Plaintiff has proposed in its construction.

For the foregoing reasons, the Court will construe these terms to mean "specified optical input signal" and "specified optical output signal," respectively.[24]

IV. CONCLUSION

For the foregoing reasons, I recommend that the Court adopt the following constructions:

1. "access network" means "a network external to the optical network"
2. "all-optical switch" means "a device that switches optical signals without electrical conversion"
3. "optical access ingress subsystem" and "optical access ingress subsystem which is adapted to receive an optical signal associated with an access network" means "a subsystem for receiving one or more optical signals, originating from an access network, which are compliant with the optical network"
4. "optical access egress subsystem" and "optical access egress subsystem which is adapted to direct the optical signal toward an access network" means "a subsystem for directing one or more optical signals, which are compliant with the optical network, toward an access network"
5. "transport ingress subsystem" means "a subsystem that receives one or more multiplexed signals from the optical network and transmits single-wavelength signals to the optical switching subsystem"

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[24] Although Plaintiff suggests changing the word "specified" from the claims to the term "particular," the Court finds that this suggested rewriting of the claims would not clarify their meaning or resolve the parties' dispute over whether the terms-at-issue refer to an optical signal or a physical port.

6. "transport egress subsystem" means "a subsystem that receives one or more single-wavelength signals from the optical switching subsystem and transmits multiplexed signals to the optical network"

7. "adapted to selectively provide optical coupling between the transport ingress subsystem and at least one of (1) the optical access egress subsystem, and (2) the transport egress subsystem" in claim 1 means "capable of switching optical signals from the transport ingress subsystem to (1) the optical access egress subsystem and to (2) the transport egress subsystem"

8. "adapted to selectively provide optical coupling between the transport egress subsystem and at least one of (1) the optical access ingress subsystem and (2) the transport ingress subsystem" in claim 25 means "capable of switching optical signals to the transport egress subsystem from (1) the optical access ingress subsystem, and from (2) the transport ingress subsystem"

9. "specified optical input" means "specified optical input signal"

10. "specified optical output" means "specified optical output signal"

This Report and Recommendation is filed pursuant to 28 U.S.C. § 636(b)(1)(B), Fed. R. Civ. P. 72(b)(1), and D. Del. LR 72.1. The parties may serve and file specific written objections within fourteen (14) days after being served with a copy of this Report and Recommendation. Fed. R. Civ. P. 72(b)(2). The failure of a party to object to legal conclusions may result in the loss of the right to de novo review in the district court. *See Henderson v. Carlson*, 812 F.2d 874, 878–79 (3d Cir. 1987); *Sincavage v. Barnhart*, 171 F. App'x 924, 925 n.1 (3d Cir. 2006).

The parties are directed to the Court's Standing Order In Non-Pro Se Matters For Objections Filed Under Fed. R. Civ. P. 72, dated November 16, 2009, a copy of which is available on the Court's website (http://www.ded.uscourts.gov).

Dated: August 3, 2012

Christopher J. Burke
United States Magistrate Judge